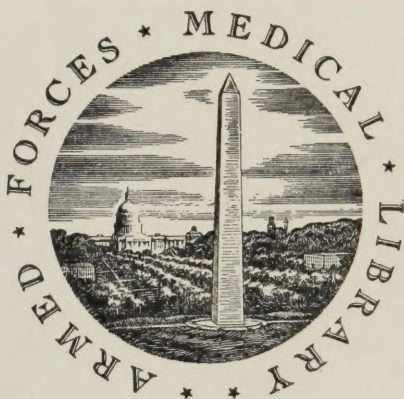


UNITED STATES OF AMERICA



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WASHINGTON, D.C.

Burwell Edwin L. Wall
(L.)

OBSERVATIONS
ON THE
DIGITALIS PURPUREA,
OR
FOX-GLOVE.



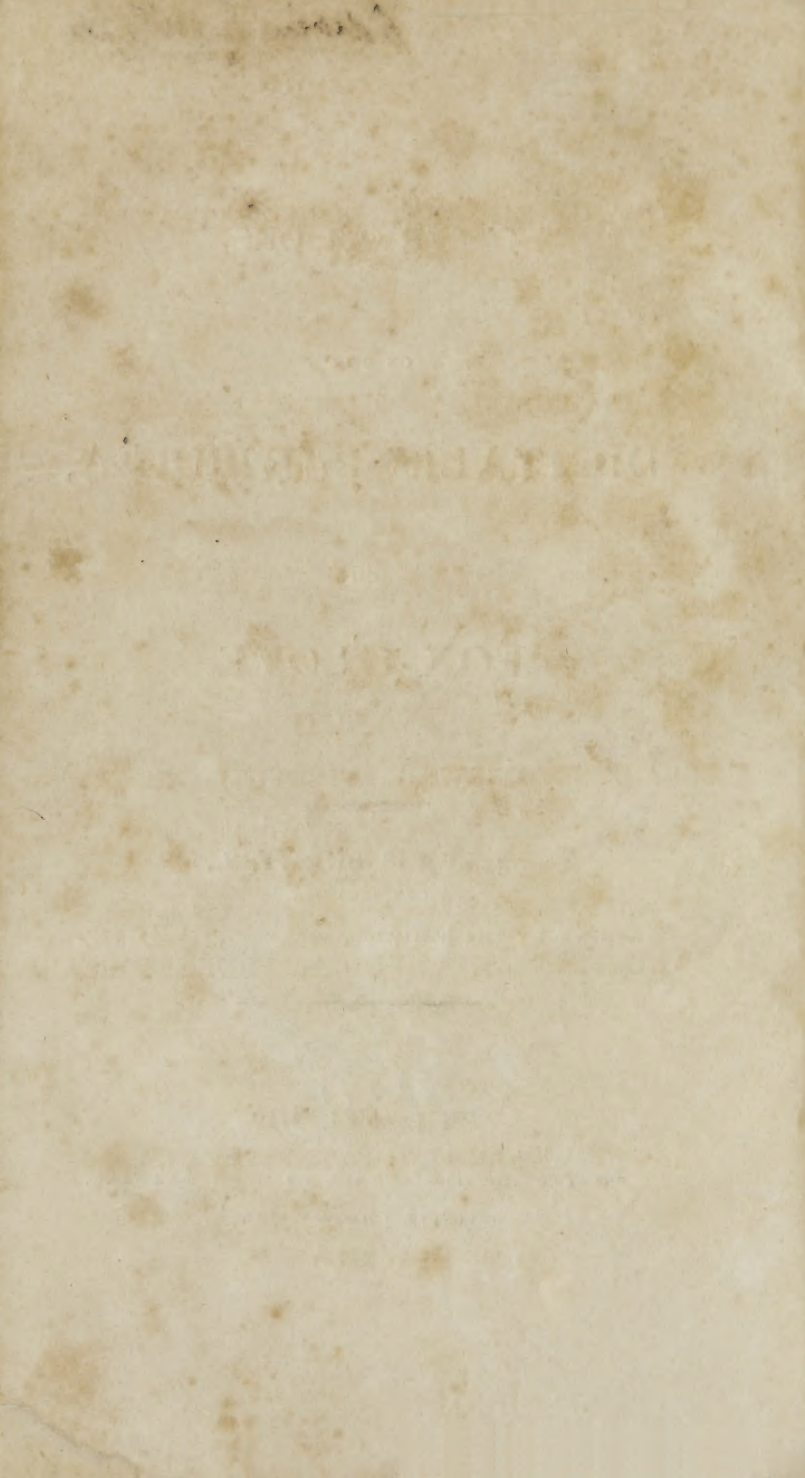
BY LEWIS BURWELL,
OF VIRGINIA,

MEMBER OF THE PHILADELPHIA MEDICAL SOCIETY.

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1805.



AN INAUGURAL DISSERTATION

FOR

THE DEGREE OF DOCTOR OF MEDICINE,

SUBMITTED

TO THE EXAMINATION

OF THE

REV. JOHN ANDREWS, D. D. PROVOST, (PRO TEM.)

THE

TRUSTEES AND MEDICAL PROFESSORS

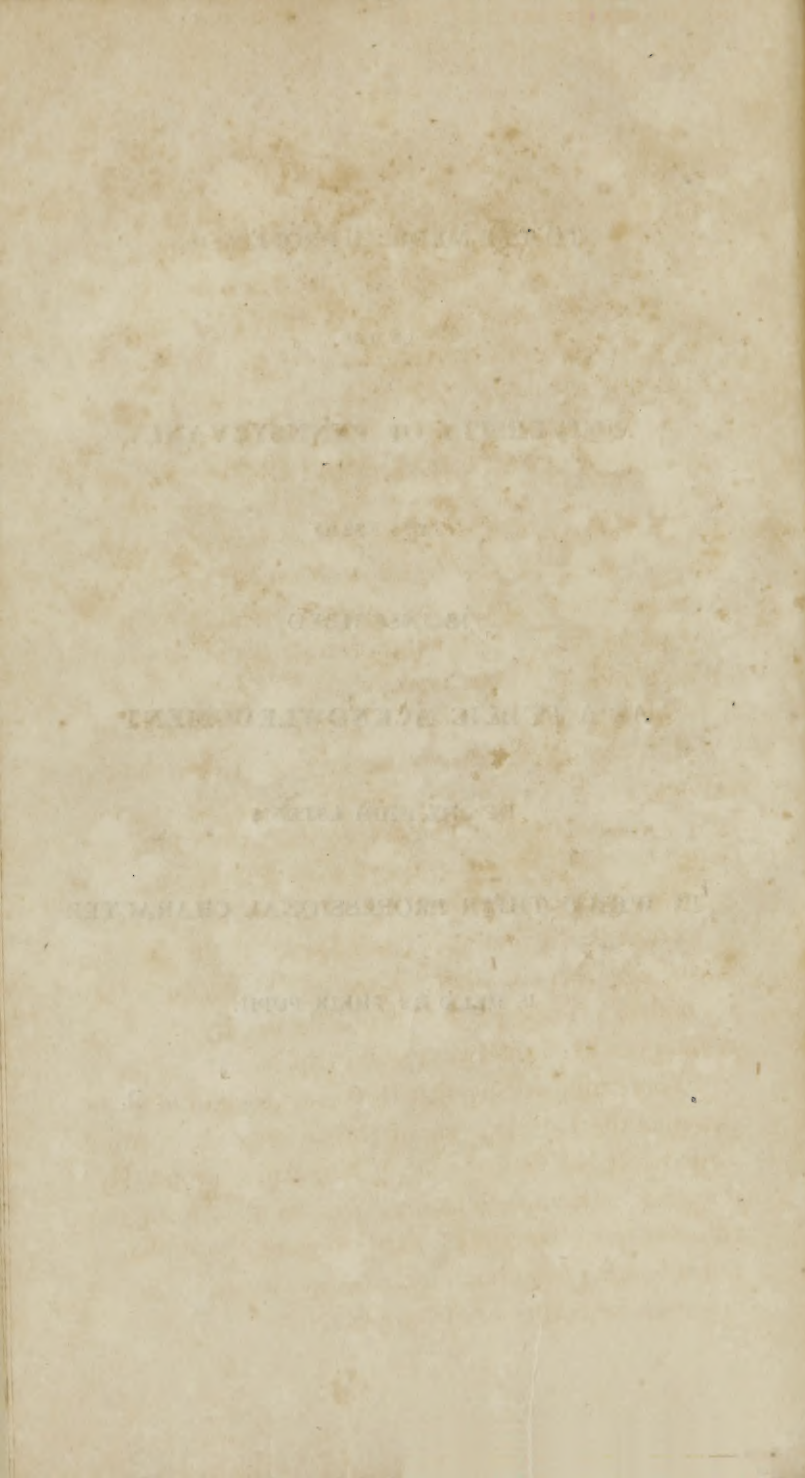
OF

THE UNIVERSITY OF PENNSYLVANIA,

ON THE 5th OF JUNE, 1805.

TO THE MEDICAL PROFESSORS
OF THE
UNIVERSITY OF PENNSYLVANIA,
THIS ESSAY
IS INSCRIBED
AS A PUBLIC ACKNOWLEDGMENT
OF THE HIGH ESTEEM
IN WHICH THEIR PROFESSIONAL CHARACTER
IS HELD BY THEIR PUPIL

L. B.



OBSERVATIONS &c.

NATURAL HISTORY.

The *Digitalis Purpurea*, or Foxglove of the shops, is not a native of the United States; though the climate appears to be very congenial to it, as we judge from its luxuriant growth in our gardens: but is imported annually from Europe.

Linnæus placed it in the 2d order of the 14th class, or didynamia angiospermia, of his sexual system of Botany.

The essential characters of the genus are, cup with 5 divisions; blossom bell shaped, bulging; capsule egg-shaped, 2 celled.

Digitalis Purpurea. Little leaves of the empalement, egg shaped, sharp; blossom blunt, the upper lip entire. The bellying part on the inside, sprinkled with spots like little eyes; leaves sprinkled. LINN.

That eminent Swedish Botanist, placed our plant amongst the *Luridæ*, one of the orders of his natural system. It has for congeners, *Nicotiana*, *atropa*, *Hyoscyamus*, *Datura*, *Solanum*, &c. so that from the knowledge we possess of the virtues of those plants, and reasoning from botanical analogy, we might be led to guess something of its properties.

Curtis in his *Flora Londinensis*, gives the following elegant description of the *Digitalis Purpurea*, viz. Root biennial and fibrous.

Stalk from three to six feet high, simple, upright, leafy, round, and pubescent or downy.

Leaves of a pointed oval shape, serrated, veiny underneath, whitish and pubescent; the footstalks short and winged.

Flowers growing in a spike, pendulous, laying one over another, all one way.

Peduncles sustaining one flower, pubescent thickest at top, after the flower drops off, becoming nearly upright.

Calyx: a Perianthium divided into five segments, which are of an oval-point, sharp, and ribbed, the uppermost narrower than the rest.

Corolla monopetalous, somewhat bell-shaped, purple, and marked in the inside with little eyes; the tube large, spreading, bulging out backwards; the base cylindrical, and as if it had been tied with a ligature; the limb small and quadrifid, the upper segment entire, and as if cut off, the lower segment larger and bent in.

Stamina: four filaments inserted into the bottom of the Corolla, white, a little broadest at top, crooked at bottom, two long and two short; another at first large, turgid, oval, touching at bottom, of a yellowish colour and often spotted; lastly changing both their form and situation in a singular manner.

Pistillum: Germen rather conical, of a yellow green colour; Style simple; Stigma bifid.

Nectary: a gland surrounding the bottom of the germen.

Seed-vessel: a pointed ovate capsule, of two cavities and two valves, the lowermost valve splitting in two.

Seeds: Numerous, blackish, small, as if cut off at each end.

The *Digitalis* is a biennial plant; delighting most in a d. y, sandy soil. It flowers in June and July.

Every part of the plant is possessed of nearly the same bitter herbaceous taste: but its medicinal properties are varied somewhat by the age of the plant and season of the year. The Leaves; however; being the most powerful; are preferred for medical use.

EFFECTS OF DIGITALIS

ON

THE SYSTEM.

These were said to be of the most powerful and directly Sedative nature, with which we were acquainted, till within a few years past. The first person who contested this opinion; was, I believe, Dr. B. S. Barton, Professor of Materia Medica in the University of Pennsylvania. This learned Professor is so far from considering our medicine a Sedative; if there be such a one: that he thinks it more properly classed amongst the more powerful Stimuli.

The truth of the opinion of its Stimulant nature, has been corroborated by the experiments of Dr. Moore: published in his Inaugural dissertation in Philadelphia in 1800; as also by the following experiments; which were conducted with care, and in the presence of some of my fellow graduates, viz.

EXPERIMENT THE FIRST.

Having fasted, and taken very moderate exercise till 10 o'clock in the morning: I took a pill, containing the fourth of a grain, of the powdered leaves

of the Digitalis. By attention to my pulse; which beat 68 strokes in a minute; the following effects, were observed, viz.

In	Minutes.					
	5	10	15	20	25	30
	68	72	74	74	70	68

after which no farther change was observed, although attention was paid to my pulse for some time longer. In this experiment, as also in the subsequent experiments, my pulse was not excited in frequency only, by the stimulating power of the pill; but also considerably in force.

EXPERIMENT THE SECOND.

At half past 12 o'clock; my system being nearly in the same state, as at 10 o'clock; I took another pill of the same size as the former: which produced the following effects on my pulse, beating 68 strokes in a minute as before, viz.

In	Minutes.									
	5	10	15	20	25	30	35	40	50	60
	68	68	68	74	74	70	64	66	68	68

after which no alteration was perceived. In this experiment my pulse was a little depressed for a short time, which was not the case in the first.

EXPERIMENT THE THIRD.

At 6 o'clock in the evening of the same day, having dined plentifully, and exercised myself afterwards; I took another of the same pills. But my system was so much excited, that my pulse beat 78

strokes in a minute: in consequence of which I could discover no sensible effect from the pill.

The above-experiments were repeated on different days; but there was so much uniformity in their results, as to render it unnecessary to insert them.

These experiments convince me of the propriety of the very cautious use of this medicine; as recommended by Dr. Barton, in his lectures on *Materia Medica*. He advises to begin with doses of a Quarter of a grain, increasing then gradually: particularly in those cases where we cannot see the patient, at least, once a day. I have no doubt from the very sensible effects of doses of that size, on my system; that much harm has been done by beginning with much larger doses, as Two or Three grains, as recommended by Dr. Withering.

But independent of these experiments, a very evident demonstration of the powerful Stimulant nature of our plant, may be drawn from its effects on the system; when taken accidentally, or in too large doses.

Dodonæus relates an instance of several persons being attacked with excessive Vomiting; in consequence of eating a kind of Omalade; in which the leaves of the *Digitalis* was an ingredient. But I need not have resorted to such authority for a proof of its powerful stimulating action on the stomach; as most, if not all, of those Physicians, who have used our medicine; can, I believe, bear testimony of its violent Emetic and Cathartic effects.

The following fact will also serve to shew the stimulating power of this medicine, in a still higher degree.

Although I do not recollect the author of this case, yet its truth need not be doubted, as Dr. Barton related it in his lectures on *Materia Medica*. The fact alluded to is this, viz.—Several persons who had unintentionally taken the Foxglove, were excessively intoxicated; but some, on whom the plant operates more powerfully, or who perhaps took a larger quantity, were so violently affected as to vomit Blood. This I suppose was owing to the action of the *Digitalis* on the blood-vessels of the Stomach, being so violent as to cause an extravasation of their contents: to do which requires no inert agent.

Another fact in favour of my position; is its Sialagogue power, here we see a strong analogy between the Foxglove and Mercury; which is not only universally allowed to be a Stimulant; but to so great a degree does it possess that property, that it has been called the Sampson of the *Materia Medica*.

But least the fact, on which this analogy is founded should be doubted; I refer the sceptic to the history of two or three cases, given by Dr. Withering; in his treatise on our plant: which induced him to doubt if it did not sometimes Salivate. Should these cases be not sufficient to convince him; he may see other similar cases recorded in Dr. Barton's *Medical and Physical Journal*.*

Being myself convinced; but whether I have convinced others, is not for me to say: as well, of the erroneousness of the opinion, of the Sedative nature, of the *Digitalis*; as of the correctness of the idea, of its powerful Stimulant property: I shall proceed to make a few observations on its medicinal uses.

* See Part I. p. 80.

MEDICINAL USES

OF THE

DIGITALIS PURPUREA.

The Foxglove was used as a medicine, as long ago as the Sixteenth century. It was used, in those times, chiefly in Epilepsy and Scrophula: but, as from its inefficacy, in those obstinate diseases; it is very seldom, if ever, used in such cases, in our days, I shall make no remarks on its use in those diseases; but will proceed to make a few observations on its use, in Dropsical affections.

IN DROPSY.

The Digitalis has been much used, and still more highly recommended in cases of Dropsy.

To Dr. Darwin we are indebted for our first authentic knowledge of the efficacy of the Foxglove in the cure of this disease. That celebrated Physician

observed, this medicine, to be peculiarly efficacious in those cases, of this disease, which are the consequence of the excessive use of ardent Spirits. This observation, though not remarked by any other writer on the subject; I am authorised to say by Dr. B. S. Barton, is very correct: as he has seen astonishing efficacy from the use of the *Digitalis* in dropsical cases, the subjects of which were or had been Drunkards.

But the *Digitalis* owes not a little of its celebrity, as a Diuretic; to Dr. Withering of Birmingham.

This author considers it the best and most certain diuretic with which we are acquainted; as also the best remedy for Dropsy. But I think this author, like most others, in recommending a favourite medicine; will be found, upon inquiry, to have given rather too exalted a character, to our medicine.

The foundation of the above-opinion can scarcely be supposed to rest on my own experience, although I have seen it used in several instances, and oftener without any salutary effect than otherwise; but on that of Dr. Ferriar of Manchester: whose authority, I deem equally as respectable as Dr. Witherings.

Dr. Ferriar, very justly, concludes, from the impartial history of every hydropic case, which occurred in the Manchester Infirmary, in a certain length of time; that the Cream of Tartar is a better Hydragogue than *Digitalis*.

As an additional support to my position I shall add the authority of Dr. Barton, who tells us, in his lectures on *Materia Medica*: that he has not only found the Squill a more certain and safe Diuretic; but

has used it successfully, in Dropsy, after the *Digitalis* had failed.

Not only Experience, but Theory also seems to militate against Dr. Withering's exalted opinion of the efficacy of the *Digitalis* in the cure of dropsical affections.

The Theory of this disease; which appears to me the most plausible, and that which is corroborated by daily experience, as we prove from the more successful practice, in this disease, induced from it; is that given us by Dr. Rush, professor of the Institutes, and Practice of Medicine, in this University. For a delineation of that Theory, and the arguments in support of it; I must refer to the second volume of that distinguished Physician's Medical Inquiries, and Observations; as the limits of an inaugural dissertation, are too confined to admit of their insertion.

It will be sufficient for my purpose to observe, that he conceives dropsy to be attended with two very different states of the System; which he designates by the terms Tonic and Atonic. The former species or tonic dropsy; is that which is the effect of an excessive morbid, or inflammatory action of the sanguiferous system: the latter or atonic dropsy is that species which is the consequence of diminished, or feeble morbid action of the system.

The cure of Tonic dropsy, should be attempted by all those means, which tend to lessen the inflammatory action of the system; as Blood-letting, Cathartics, &c. with the Anti-phlogistic regimen. Here it might be said the *Digitalis* would be a very proper remedy, from its remarkable effect of lowering the Pulse. To this, I answer; that this is a secondary effect, and the consequence of a primary stimulant operation on the

system; which is not peculiar to the *Digitalis*, but common, more or less, with all Stimuli. And as stimulants are certainly injurious in this state of the system, I think we should loose more, by the primary stimulant operation; than we should gain by the secondary sedative effect of this medicine.

This being the case I think we may fairly conclude, that the *Digitalis* cannot be advantageously administered in tonic Dropsy, which is frequently the state of that disease.

If then our medicine cannot be advantageously used in tonic Dropsy, and as it certainly has been so used in this disease, it must be adapted to the atonic stage of it, or that species which is attended with feeble morbid action; but here Experience, which is certainly a much better standard, of the merits of any medicine; than Theory; will appear to detract, somewhat, from the character of the Foxglove. For, I believe, the experience of all authors unite in telling us, to expect very little or no benefit from the exhibition of the *Digitalis* in those cases of Dropsy, where there is great Debility.

It would appear then, from the above, that the *Digitalis* is, so far from being the best remedy in Dropsy, (as Dr. Withering thought, and said it was;) that it is adapted to a few cases only; which, though they are of the atonic species are not attended by great debility.

Least it should be thought, from what I have said; that I have a very contemptible opinion of the Foxglove in the treatment of Dropsies: it may not be amiss to add, that so far am I from entertaining such

an opinion, that I have no doubt of its having been given very advantageously in the treatment of this disease, and may still be so used, when conducted with skill and judgment.

But I must also add, that I have no doubt much injury has been done, by the injudicious use of a medicine, of such active powers as the *Digitalis*; which would otherwise have been avoided by the use of less active medicines.

I shall conclude my observations on the use of the *Digitalis* in this disease by observing; that I would always use it when other medicines have failed; but would not in the first instance prefer it to some other *Hydragogues*.

IN PHTHISIS PULMONALIS.

The *Digitalis Purpurea*, has been highly recommended in this disease also; but here, as in dropsy, I fear, it has been too favourably spoken of.

Amongst its advocates in this disease, are the respectable authorities of Drs. Darwin, Withering, Fowler, Drake, Beddoes, and many others. So exalted an opinion did Dr. Beddoes entertain, of the efficacy of the Foxglove, in the treatment of Pulmonary Consumption; that he declared, he thought it would as certainly cure Phthisis, as the Peruvian bark does the Intermittent fever.

To say the *Digitalis* has done no good in the treatment of Phthisical affections, and in the face of such high authority as the above, would, perhaps, be too presumptuous, or even if I should say, it has done

more harm than good. But I think, later experience has, and future will, justify me in saying that this medicine is inferior to several others, in the treatment of genuine Phthisis Pulmonalis: some of which I shall take notice of.

Under this impression, therefore, I should prefer combating this direful disease, with the *Lancet* and *Mercury*, in the one stage; or the Cordial nourishing plan in the other, or last stage.

From the successful use of Dr. Moseley's Vitriolic solution, in this disease; which I witnessed, in the Alms-House, of this city, last winter; under the direction of Dr. Barton: I think it much more deserving of the reputation it has acquired for the cure of Phthisis, than the Foxglove. In corroboration of my opinion of the efficacy of the Vitriolic solution, in this disease; I have the authority of Dr. B. S. Barton, for saying, he has found its effects more salutary in what is generally called, Phthisis Pulmonalis; than those of any other medicine.

Although I deem the *Digitalis* inferior, as a remedy for Phthisis, to either of the other plans of treating this disease which I have spoken of; yet it may not be amiss to insert the following cases, wherein this medicine was successfully administered in this obstinate disease: communicated to me by my fellow graduate, Mr. T. Ewell. They are as follow, viz.

“ While I was attending Dr. Weems's practice, five cases of Phthisis Pulmonalis occurred. Mr. Ringgold, a merchant of great respectability; and Mr. McCormick, a carpenter; who laboured under this disease; were both successfully treated by this excel-

lent practitioner. The principal medicine, which he employed was the *Digitalis Purpurea*. This was given in pills, three or four times a day; and the dose gradually increased. It uniformly lessened the arterial action, and kept it down between 30 and 40 strokes in a minute.

The success of these cases served to raise very high Dr. Weems's estimation of the efficacy of this plant, in the treatment of this disease. His opinion, however, was somewhat lessened by the result of its use in three other patients. In one of these it failed performing a cure. But it very evidently palliated the symptoms, and retarded the progress of the disease. Two of these patients died of a *Hæmoptysis*, which probably might have been checked by proper blood-letting."

IN MANIA.

Digitalis has been advantageously used, and its use recommended in Maniacal cases, by Drs. Ferriar, Withering, &c. Also some cases where it was beneficially employed in this disease; are recorded in Duncan's Annals: but here likewise, I think it a very precarious remedy.

Guided by the pathology of this disease, as given us by Dr. Rush, I suppose its salutary effects must be confined, to the acute or inflammatory stage of Mania; on account of its secondary Sedative effect on the pulse. But the same effect can generally, more certainly be induced by Blood-letting, &c. and therefore should be preferred.

In the atonic or chronic stage of Mania, I believe very little, if any, good will be derived from the Digitalis, or any other article of the Materia Medica.

But as Mania may sometimes depend on Serous effusions, in the brain; probably those cases wherein its effects were so salutary, were of this nature, although I believe such cases have occurred, yet they are so rarely met with: that we may justly conclude, that the Fox-glove is of little use in Mania.

IN HÆMORRHAGIA.

The Fox-glove has been successfully administered in Hæmoptysis, and other species of Hæmorrhagy; by most of the authors already quoted.

As Hæmoptysis is generally of an active nature, I expect the Digitalis has been given, with an idea of its being a Sedative. But later experience has proved the erroneousness of this idea; as is evident from the preference now given to Blood-letting, Sacc. Saturni, Ipecacuanha, &c. in the treatment of this disease.

IN ULCERS.

An external application of the Digitalis to obstinate Ulcers, was one of the first uses made of the plant in medicine, this practice has been nearly abandoned; but for what reasons, I do not know, as I imagine much good might result from its stimulating effect on Indolent ulcers, thereby inducing the secretion of more laudable pus.

So exalted an opinion did the Italians entertain of the *Digitalis*, as a *Vulnerary*; that they have the following proverb concerning it, viz. *Aralda tutte le piaghe salda*: i. e. Fox-glove cures all wounds.

RHII. HIST. PLANT.

IN DYSURY.

Cases of its salutary effects in this distressing complaint may be seen in Dr. Withering's Essay on the *Digitalis*. He relates three or four depending on calculous in the bladder; which were relieved by the exhibition of this medicine, given with a view to its diuretic effect; as they were Dropsical patients.

Dr. Barton also, has experienced the happiest effect from this plant, in Dysury; in 3 or 4 persons,* one of whom had resorted to the Catheter, repeatedly, as the only resource of relief, for her disease. This patient being subject to repeated attacks of this disease, has immediate recourse to the Fox-glove, from which she always derives certain and early relief.

When I reflect on the frequent ineffectual attempts which are made to relieve this common disease, which is accompanied with a most excruciating set of symptoms; by Medical treatment, or Surgical aid: I am induced to believe that the powers of the Fox-glove in Dysury form, by no means an inconsiderable portion of its medical virtues, and to recommend it to the farther attention of Medical Practitioners.

* The following is a statement of one of these cases; favoured me by the Doctor. He says "I have lately given ninety drops

of a saturated tincture of Digitalis, to a gentleman labouring under a complete suppression of urine, attended with excruciating pain. He took this quantity, at 5 different doses, between the hours of nine and one, with the effect of completely relieving him, by causing a flow of water, and removing pain. Since this he had had too slight, but threatening, returns, of the same complaint, and each time procured almost immediate relief, by taking twenty drops of the tincture. The strangury, in the case of the above patient, seemed to be independent of culculus, and of the *arthritic* kind.

ERRATA.

P. 7. l. 15, *for* sprinkled *r.* wrinkled.

P. 8. l. 28, *for* another *r.* Antheræ.

P. 16. l. 24. *for* sanguifirous *r.* sanguiferous.

Med. Hist.

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